A CASE STUDY OF FUELWOOD CONSUMPTION IN RURAL HOUSEHOLDS OF DISTRICT ATTOCK (PAKISTAN)

M. Saqib*, Mushtaq Ahmad, Mir Ajab Khan and R.M. Zarif**

Abstract

Fuelwood consumption and supply pattern in the rural area of district Attock was studied by sample survey of randomly selected villages. Data from sample households were collected with the help of structured and pretested questionnaire. In all 90 respondents were randomly selected and interviewed. Analysis revealed that fuelwood was the major source of household energy in the area. About 83% of the household use fuelwood as well as other cheaper fuels. Only 17% were found using efficient commercial fuels (LPG, Kerosine etc.) to meet their energy needs. The data show that the average household size in the study area is nearly 6 persons. The increase in household size results in increasing total fuel consumption.

Introduction

Wood is one of the primitive material used by the mankind. It helped early man to widen the sphere of the activities, tame the environments, develop societies and advance towards civilization. The end uses of wood were and are still the versatile and important than other raw materials. In spite of advancement in technology and science, the substitution of wood fuel with modern fuels could not take place in the rural economies of developing countries such as Pakistan. Economic reasons coupled with lack of access to modern fuels, small land holdings, unjust tenure system and low literacy level were the factors that may resist the substitution of traditional fuel demanded by the community. Many studies of the past also indicate that the households of low income level with subsistence living depending heavily on biofuels both in rural and urban areas. These fuels also receiving attention of even industrialized countries because of fixed and non-renewable nature of commercial fuel reserves. The environmental and economic standards imposed for generation and usage of nuclear energy had changed thinking of producers to revert back to environmental friendly energy producing biological processes.

The energy needs in developing countries are expanding at a faster rate because of increasing living standards, developing transport systems and

* Department of Biological Sciences, Quaid-i-Azam University, Islamabad

** Pakistan Forest Institute, Peshawar

commercializing communication linkages. Currently world wide annual production of fuel wood is estimated at 1820 million m (Bartwal, 1987). About 85% of this quantity is produced and consumed in developing countries. Biomass still contributes about 14% of the total world energy requirement in developed world. But 38% of the energy needs in developing countries is being met by using biomass. It includes fuelwood, crop residues and dung. Biofuels have advantages of availability, range, local production, low procurement cost, ease in storage and enviornmental acceptability (Maikhuri, 1991).

It is common belief that the wood as a fuel will be steadily replaced by the efficient and convenient commercial energy fuels the way happened in the developed countries over the period of last 100 years. However, increase in oil prices and realization for conservative use of non-renewable sources of energy, wood in the near future will start receiving more attention at all costs to resolve energy problem.

In Pakistan wood is a commodity produced by the state owned forests, private farmlands and wastelands (common and state). A survey of the Household Energy Strategy (HES) conducted by the Government of Pakistan has confirmed a high level of fuelwood consumption in the country. Traditional fuels account for 52% of the total 38.2 million tones of oil equivalent (MTOE) energy consumed in Pakistan. Major portion (86%) of the household energy consumed is generated by biomass fuels. The study also observed that as little as 10% of the country's woodfuel supplies come from state forests. It further noted that more than 75% of the country's households use fuelwood.The figures for rural and urban areas are 91% and 52.2% respectively (Hafiz, 1997).

The review of literature strongly reveals that Pakistan, like other underdeveloped countries is facing serious energy shortages. This is primarily due to poor energy resource base of both traditional and commercial nature. The gap between supply and demand is increasing because of growing population and expansion in various sectors of the economy. The use of wood as a fuel, therefore, warrants a critical study on all its technical and economic aspects. The idea for conducting this survey was developed to judge whether majority population of the rural areas in district Attock depend for its energy requirements on fuelwood or not. The forest resources of the area are also under depletion at a very fast rate resulting in ecological imbalances. Whether this retrogressive trend has created serious shortages in the area or not. These the study attempts to find out the following information.

- Determining the present household consumption of fuelwood

- Factors influencing the demand of fuelwood
- Efforts of local farmers to increase tree cover

Geo-climatic conditions

Attock district lies between 37°.7 and 34° North latitude, 71°.45 and 73° East longitude. It is bounded on the North and West by the river Indus. In the east lies district Haripur of NWFP and Rawalpindi district of Punjab. The southern side is occupied bydistrict Chakwal of the Punjab. The average annual rainfall is 783 mm. The mean maximum temperature in January is 17.92°C and mean minimum January temperature is 5.24°C. The mean maximum temperature in July is 36.4°C and mean minimum is 26.45°C. The total area of the district is 6856.703 sq. km (2647.395 sq. miles) (Anon, 1998).

Forest vegetation

About 9.5% of the total land area in the district is covered with forest which is above the country average of 5%. Most of the forests are located in the Kalachitta Mountains. The fertile lands of Chach area (Tehsil Attock) do support larger number of plant species. The dominant species on the Northern slopes of Kalachitta hills are: *Acacia modesta, Olea ferruginea, Dodonea viscosa, Gymnosprea royleana* and *Adhatoda vasica*. Among the ravines small groups of *Grewia oppositifolia, Flacourtia ramontachi, Albizzia lebbek, Ficus* spp. *Morus* spp. *Dalbergia sissoo, Eucalyptus* spp.etc. are chief auxiliaries (Anon, 1998).

Methodology

According to the objectives of the study, a random sampling survey of selected areas in district Attock was conducted during 2000-2001. Eighteen villages and five households from each village were randomly selected. The sample villages were Adil Zai, Bagh Nilab, Boota, Chui, Dukhnair, Galilia, Ghourghushti, Ghuri Pandak, Haroon, Mari Kungoor, Muraria, Pehti, Peerdad, Peer Zai, Sarwana, Shahddir, Soganda Batta and Waisa. In addition to ninety household respondents, 35 traders were also interviewed through separate questionnaire related to source of fuelwood supply, average monthly stocks, preferred species by consumers and problems related with fuelwood business.

Results and Discussion

The field data obtained through interviews were coded and analyzed with the help of SAS computer programme. The analysis revealed following results.

Household size

Majority of the respondents (66%) had family size between 4-8 members. Only 23% respondents had family size of upto 4 while the lowest percentage (11%) of household size was above 8 members (Table 1). The large portion of household population had closer household figure to the national average.

Table 1. Distribution of the sample household according to their size

No. of family members	Frequency	Percentage
Upto 4	21	23
4-8	59	66
Above 8	10	11
Total	90	100

Land holding size

About 32% respondents were landless. Majority (58%) had landholding between 1-40 kanals. A small portion (45%) had land area between 40-80. Only 6% of these had land size above 80 kanals (Table 2). The data clearly indicate that the majority population in the study area is either without any landholding or own very small parcel of land.

Table 2. Distribution of the sample household according to land holding size

Land in Kanals	Frequency	Percentage
0	29	32
1-4	52	58
40-80	4	4
Above 88	5	6
Total	90	100

Source of fuelwood

The mode of obtaining fuelwood was classified into two groups those who purchase from the market and others who do not. Most of the respondents (68%) had their own wood sources. About one third of the population (32%) purchased fuelwood from the market. The data clearly depict that majority population had tree sources to meet their domestic needs without purchase (Table 3).

Table 3. Distribution of sample household by fuelwood sources.

Wood source	Frequency	Percentage
Purchase	29	32
Do not purchase	61	68
Total	90	100

Mechanism of fuelwood supply to traders

The traders receives fuelwood through different channels. The data (Table 4) reveal that to run their business, majority (43%) traders procure fuelwood from the farmlands. Government forests provide only 9% fuelwood. In addition to this about 6% of fuelwood is supplied to the market jointly by farmlands and government forest. However, the ban on scrub forests does not permit commercial felling because of deteriorated resource conditions.

Table 4. Mechanism of fuelwood supply

Source	Frequency	Percentage
Govt. Forest	3	9
Farmland	15	43
Contractor	5	14
Farmland + Contractor	10	28
Farmland + Govt Forest	35	100

It can safely be concluded that farmlands have more potential for fuelwood production. More attention be paid to encourage farmers for raising trees as a crop.

Species preference

Thirty five (35) respondents dealing with fuelwood business were interviewed to know the kind of species purchased by the people. They had stock of many species such as *Eucalyputs* spp., *Dalbergia sissoo, Morus* spp., *Acacia modestia, Tamarix* spp. And *Olea ferruginea* etc.

The majority businessmen (91%) purchased mixture of species to use as fuelwood. Only small numbers (9%) were dealing in individual species. It can be concluded that people mostly purchased mixed species for fuel. It was also considered necessary to check the prices of some important fuelwood (Table 5).

The data *Acacia modesta* (Phullahi) was selling at highest price followed by Tali. The lowest prices were fetched by *Eucalyptus* and Berri.

Table 5. Price of fuelwood species per Mund (40 kg)

No.	Species	Local name	Family	Price (Rs)/ Mund
1.	*Acacia modesta*	Phullahi	Mimosaceae	70-80
2.	*Dalbergia sissoo*	Tali	Papilionaceae	60-75
3.	*Eucalyptus globulus*	Lachi/Eucalyptus	Myrtaceae	40-45
4.	*Prosopis cineraria*	Desi Kiker	Mimosaceae	45-55
5.	*Melia azedarach*	Dherak	Meliaceae	60-70
6.	*Dodonaea viscosa*	Sanatha	Sapindaceae	50-60
7.	*Olea ferruginea*	Kao	Oleaceae	50-65
8.	*Zizyphus nummularia*	Jer Berri	Rhamnaceae	40-50

Conclusion and Recommendations

The survey indicates that the choice of fuel in rural areas is greatly influenced by the ease in access to fuelwood and agricultural residue resources. Majority (83%) of the households were using fuelwood and crop residues whereas only 17% of the household were found using efficient commercial fuels (LPG, Kerosine etc.) but with fuelwood.

Except family size, none of the socio-economic factors had influence on wood consumption of the household. The average per capital fuelwood consumption of the sample population was 2500 kg. Against this the consumption of Kerosine oil was only 3 liter and LPG was 57 kg (about 5 cylinders).

The data analysis revealed that average household size in the study area was 6 and average landholding size was 43 kanals. Out of total sampled population only 39% were involved in farming, 28% were in government service and 14% in business. About one fifth of the population (16%) were working as casual labour. In the study area only 12% respondents were found illiterate. The percentage of literate people seems to be quite high in Tehsil Attock.

The analysis of the study further revealed that there is a direct relationship between the quantity of fuelwood consumed and household size. The fuelwood consumption was increasing with the increase in household size. It was also observed that crop residues and cow dung were the traditional and

easily available sources of energy. In fact these can be used in a better way than fuel. The household in the study area preferred fuel collection even if it had low calorific vale.

Recommendations

1. Government should encourage the people to plant trees on their farmlands by providing seedlings.

2. Social forestry programmes be launched to convince people about tree planting on their lands.

3. Fast growing fuelwood species such as *Melia azedarach, Tamarix* spp. *Acacia nilotica* and *Morus* spp. etc. be introduced in the area.

References

Amacher, G. S., W. F. Hyde and K. R. Kanel, 1996. Household fuelwood demand and supply in Nepal's tarai and mid-hills, choice between cash outlays and labour opportunity. World Development Oxford 24: 11. P. 1725-1736.

Anon, 1998. District census report of Attock, population census organization. Statistical Division, Islamabad.

Bartwal, P.S. 1987. Fuelwood consumption pattern in rural areas – a case study. Journal of Tropical Forestry 3: 2, p. 136-141.

Chauhan, P. S. and P. O. Ingle 1988. Role of farm forestry in meeting the fuel-wood requirement of the villagers. Advances in Forestry Research in India. 2: p. 153-160.

Dunkerley, J., M. Macauley, M. Naimuddin, and P. C. Agarwal. 1990. Consumption of fuelwood and other household cooking fuels in Indian cities. Energy – Policy, 18: 1, p. 92-99.

Hafiz, S. M. 1997. Woodfuel production and marketing in Pakistan Proceeding of National workshop. FAO Regional Wood Energy Development Programme in Asia. Bangkok, Thailand.

Maikhuri, R. K. 1991. Fuelwood consumption pattern of different tribal communities living in Arunachal Pradesh in northeast India. Bioresource Technology. 35: 3, p. 291-296.

Sheikh, M. I. 1987. Forest based rural enterprises. Pakistan RAPA, FARO, Bangkok.